

AP State Enterprise Architecture

People Hub

e-Pragati Requirements Specifications

Submitted to



Government of Andhra Pradesh

Submitted by



Wipro Limited

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Revision History

Version	Date	Changes	By
1.00	03/11/2015	Review comments from IT Advisor, ATPS and internal teams incorporated.	Wipro

1 Project Information

1.1 Project Overview

1.1.1 Back ground & Context

People Hub is a system envisioned by Government of Andhra Pradesh, comprising of resident demographic and socio-economic data. People Hub and its components help achieve accurate 360° view of resident data and link core data of residents with their socio-economic data to improve service delivery, accountability, and decision making. People Hub provides a framework for linking residents with different departmental schemes and programs.

The existing AP State Residents Data Hub (APSRDH) has largely been able to meet the needs of various departments today. However, the hub may have to be upgraded significantly in order to fulfil vision of e-Pragati. For example: The projected number of services that use the hub is much higher than what it is today, therefore, the people hub should support easy scalability.

1.1.2 Business Drivers

The key drivers for People Hub are:

1. Need to achieve 360 degree view of State residents.
2. Realizing e-Pragati Vision
3. Enabling seamless resident data exchange between departments
4. Preventing misuse of benefits (enrolling multiple times, non-existing beneficiaries).
5. Creating fool-proof authentication mechanism to ensure scheme benefits reaches eligible beneficiaries.

Building robust beneficiary payment transfer mechanism and reducing processing costs and instances of non-delivery of funds.

1.2 Project Objectives

The People Hub shall serve the following objectives:

- a) Establish and maintain a repository of the People data relating to the residents of the State.
- b) Provide data services to the departments and agencies of the Government, relating to seeding of Unique People ID in their databases, authentication of beneficiaries of schemes with reference to the People Hub and cleansing, updating and validating their databases.
- c) Facilitate creation of a wide-range of People Hub-enabled applications that leverage all the benefits envisaged through use of unique Identity of residents, including transfer of social benefits.
- d) Develop MIS Reports for planning and decision-support.
- e) Play a pivotal role in the realization of the Vision of AP State Enterprise Architecture, by providing reliable and quality Resident Data
- f) Provide a secure, inclusive mechanism for People to enroll and consume Government services.
- g) While meeting the aforementioned objectives, it is very important to leverage functionalities offered by existing SRDH. Therefore, People Hub shall aim to reuse APSRDH to the extent possible. **(See Annexure 3 for more details on APSRDH Architecture)**

The following section describes the benefits received by various stakeholders from People Hub are given below:

Stakeholder	Expectations from People Hub System
Residents of the State	Residents of the State will have their data stored in the People hub. They are the primary and most important stakeholder group because they are the ones who will be affected the most in case of loss or compromise of data
Departments and Agencies of the State Government	Departments and agencies use resident data in order to identify beneficiaries, and provide services. Departments can also use the data for investigation, and fraud detection purposes
Departments and Agencies of the Central Government	Central government agencies may use resident data for delivering benefits, or fraud/crime investigation
Banks and Financial Institutions operating in the State	Banks and Financial institution may use people date for checking loan eligibility, dispersing funds, or for identifying financial status of residents
Rural Area Service Providers	Service providers use resident data to deliver services to residents, particularly in rural and remote areas. Panchayats can make use of resident data to ensure that schemes meant to benefit people reaches intended target group

Entrepreneurs under the Scheme of Common Service Centre	Entrepreneurs may use people data to identify potential customers for their business
Private Institutions	Private institutions, particularly operating in the areas of Healthcare, Finance, Education and Social Services can use resident data to deliver services to residents, and also participate in government schemes.
AADHAAR Authorized Agencies	AADHAAR Authorized Service Agencies (AUAs), Authorized User Agencies (AUAs), KYC Service Agencies (KSAs) and KYC User Agencies (KUAs) operating in the State will be responsible for handling resident data, and ensuring that they are protected and secured. In short, these agencies are few of the custodians of resident data
Business correspondents of commercial banks	May use resident data to identify target customers and business opportunities. The ecosystem of technology companies, device manufacturers, solution providers, innovators and start-ups. They provide Software and Hardware solutions to People Hub ecosystem

2 Scope of Work

APTS through this tender document invites proposals from competitive bidders to be the “System Integrator (SI)” who have similar implementation experiences. The objective of this RFP is to develop applications for the identified portfolio of new services and integrate with the applications of existing services of short listed departments. System Integrator has to Design, Develop / Customize the application, Train, Handhold and Roll-out the people hub application to provide Operations & Maintenance (O & M) services for a period of three years post “Go Live”.

2.1 Scope of the Project

The implementation of the project shall be completed in <TBD> commencing from the date of award of contract to the SI and will be followed by <TBD> of Operation and Maintenance (O&M) phase.

The information contained within this RFP represents some of the high level requirements which are needed for experienced Application specialists to design a detailed and prescriptive Application Integration Architecture and to implement it on a suitable Integration platform/suite. The proposed Government Integration Architecture/Platform would then be used to integrate all the departmental applications. It will also serve as a guidance/blueprint for all future solution developments efforts at government which requires integration with other applications both within Government and externally with Government’s partners.

The following outlines major activities to be carried out by the selected bidder are stated below:

Implementation:

- 1) Project Planning and Management
- 2) Development of People Data Hub Application for the identified services
 - a) System Study
 - b) SRS preparation
 - c) Design, Development, Customization, Testing and Deployment of People Hub Application at SDC for the new services and integrated services. Also, SI has to prepare a localization framework to provide bilingual (English & Telugu) facility
- 3) IT infrastructure assessment, procurement, installation, customization, data center hosting, disaster recovery
- 4) User Acceptance Testing (UAT) of People Hub application.
- 5) Provide support for STQC Certification and C-DAC/TDIL Certification of the People Hub Application. SI has to fix all the defects / bugs as pointed by STQC and C-DAC / TDIL audit.
- 6) Operations and maintenance of entire People Hub System environment (Service delivery, Software

- & Hardware warranty & maintenance support) for the duration of <TBD> from “Go-Live” date.
- 7) Deliver all necessary project documents such as User Manual, SRS, SDD, Integration plan, Deployment plan, System testing plan and test cases, roll out plan and application support plan etc.
 - 8) Capacity Building / Training
 - a) Prepare and organize training programs to user departments (Deliverer, Controller & End-user)
 - b) Prepare user and operation manual to each department whose services will be hosted people hub application services platform.
 - c) Provide facility for Online Help to logged in users.
 - 9) Design & execution of change management, training & communication strategy for successful implementation and operation
 - 10) Operation & Maintenance (O&M) for the duration of <TBD> after launch of People Hub application state wide. Day-to-day maintenance of the People Hub application

Integration:

Integration of People Hub application with all the applications spread across Government

- 1) Creating a strategy to integrate execution with department applications
- 2) PHID seeding into the departmental databases.

Smart Pulse Survey

- 1) SPS data would be able to seamlessly integrate into People Hub Database, whenever it is made available
- 2) People Hub database would provide the required data to the app in handheld devices used by SPS representative.

Notes:

- 1) The Bidder has to prepare the work plan based on the state specific situations and dynamics in concurrence to IT E & C, APTS, to execute the project keeping in mind the current scenario/ progress of the core Infrastructure.
- 2) Refer Annexure 1 for details of Smart Pulse Survey

2.2 Resource Deployment

One of the important factors that would determine the success of the People Hub implementation in the state of Andhra is the continuous availability of domain experts like Project Manager, Integration Specialist, Enterprise Architect, Database Administrator, Change Management Expert, and Solution Architect.

The SI is expected to provide technical and operational support for the complete duration of the project. The SI should provide minimum of 8 key resource personnel listed below apart from the

regular Programmers and Test engineers as mentioned below :-

Roles	Responsibilities
Project Manager	<ul style="list-style-type: none"> • Primary contact for e-PragatiPMU for all the execution related activities • Responsible for reporting to client and monitoring progress • Develop a project plan for this effort that integrates with the e-Pragati EA project plan mentioned in the RFP • Track and report on project progress, maintain issue register, coordinate and schedule meetings • Develop weekly progress reports • Work closely with e-Pragati PMU to solve any conflicts that arise • Be the communication channel between the e-Pragati PMU and Vendor team • Overall project management and control • Control of the system life cycle from the design through close of the system • Plan, direct and control allocation of all project resources
MDM Solution Architect	<ul style="list-style-type: none"> • Provide technical clarifications on the deliverables to the e-Pragati PMU team • Develop detailed data models • Identify complete set of metadata and master datasets • Take part in the integration, stress and user acceptance testing carried out at Client location • Provide clarifications and bug fixes during Warranty support phase • Responsible for the Overall Solution of the Project • Review of HLD & LLD artefacts • Creation of the Traceability Matrix between the artefacts
Integration Architect	<ul style="list-style-type: none"> • Defining the Integration Framework for People Hub integration with Department applications, and PHID Seeding strategy • Defining strategy for integrating People Hub Data and Smart Pulse Survey data • Ensure technical implementation of services as per the People Hub reference architecture, SOA patterns, and adherence to the SOA Governance process

Project / Technical Lead	<ul style="list-style-type: none"> • Overall responsibility of Design & development effort • Lead the design & development team • Create coding standards and guidelines and perform frequent code reviews • Incorporate the feedback from the QA team as well as the e-Pragati PMU to ensure all requirements are fully met • Timely delivery of the product
Database Administrator	<ul style="list-style-type: none"> • Application Database Design and Administration • Managing the databases of the proposed People Hub system including those kept at the data centre, and DR site. • He / She shall be also responsible for data backup, database fine tuning, online synchronization of the database instances kept at DC and DR, etc.
Test Lead	<ul style="list-style-type: none"> • Prepare test plan and cases for final testing • Report all test results to Project Manager • Organize the testing activities
Business / Functional Analyst (Govt. Domain)	<ul style="list-style-type: none"> • Provide Functional Inputs to the development Team • Review the Traceability Matrix
Developers	<ul style="list-style-type: none"> • Execute the activities assigned by the Project Manager • Carry out the assigned design / development / customize / configure activities • Adhere to standards and schedules • Report the status to Project Manager

Operations and Maintenance (O & M) Support:

The System Integrator is responsible for the day to day maintenance of the system for the entire period of effective date of contract, post "Go Live". SI shall provide:-

1. Annual Technical Support (ATS) for all the licensed software
2. Providing Help desk support with Ticket generation mechanism and Escalation matrix for resolution of registered complaints.
3. Adherence to SLAs as per adopted standards. (refer Standards Document)

3 Functional Requirements

Minimum functional requirements are given below

S. No.	Functional Requirements Description
1.	People Hub shall comprise following main components: <ul style="list-style-type: none">a. The People Hub Databaseb. People Hub Data Services Systemc. People Hub Application Services System
2.	The People Hub shall provide the data support required for the other two subsystems namely, the People Hub Data Services System and the People Hub Application Services System.

3.	<p>People Hub shall maintain a centralized resident repository of Demographic and socio-economic data. The following data should be captured</p> <p>Basic resident data:</p> <ol style="list-style-type: none"> Citizen identification number ID type Name Father's Name Date of Birth or Year of Birth Gender Address Postal PIN code Photo State Residency Status GIS Latitude coordinate GIS Longitude coordinate <p>And, Socio-economic data:</p> <ol style="list-style-type: none"> Social Category LPG/Water / Electricity Consumer numbers Ration Card Number Mobile Number Status of Housing Status of ISL Members of the Family Education Employment Disability, if any Land held Livestock Vehicle & Driving License number
4.	People Hub should create and maintain one and only one unique People Hub id for every resident in the state
5.	People Hub should allow residents to register up to 5 photo ids and 5 proof of address documents, and use photo ids as citizen identification number.
6.	The hub should be flexible enough to allow Biometric authentication and Aadhaar based validation for select departments only
7.	Where biometric and Aadhaar information is not available or not allowed to be used, People hub shall implement best available alternatives, and may leverage Unique People Hub id, OTP based authentication, challenge questions, etc.

8.	People Hub shall reuse data in AP SRDH and departmental database to the extent possible. Where necessary, data quality improvement algorithms shall be applied to create a clean, golden version of the record.
9.	The People Hub shall establish the IT and network infrastructure to enable it to discharge its responsibilities efficiently, complying with the relevant Service Level Agreements.
10.	The People Hub shall establish a comprehensive Information Security Management System (ISMS) in compliance with the International and National Information Security Standards.
11.	People Hub System shall publish or register Data and Application services as web services to e-Highway and enable real-time/near real-time integration
12.	People Hub shall make Application and Data services available for consumption by batch services
13.	<p>People Hub shall provide following Application Services</p> <ul style="list-style-type: none"> • Resident Information Services • Aadhaar Authentication Services • Beneficiary Eligibility Check Services • Beneficiary Verification Services • Service delivery tracking services • Accountability and Vigilance Services • Verification Services • Scheme enrolment, and disenrollment services

14.	<p>People Hub shall provide following data services for <i>select applications and departments only</i>.</p> <ul style="list-style-type: none"> a. Seeding of Aadhaar in their databases. There are two types of seeding - Organic and Inorganic (Annexure 2), and the People Hub data services shall support both. b. Periodic update of data from UIDAI (Update Services) c. Authentication Services which includes: <ul style="list-style-type: none"> i. Type 1 Authentication - Through this offering, service delivery agencies can use Aadhaar Authentication system for matching Unique People ID and the demographic attributes (name, address, date of birth, etc.) of a resident. ii. Type 2 Authentication - This offering allows service delivery agencies to authenticate residents through One-Time-Password (OTP) delivered to resident's mobile number and/or email address present in CIDR. iii. Type 3 Authentication -Through this offering, service delivery agencies can authenticate residents using one of the biometric modalities, either iris or fingerprint. iv. Type 4 Authentication - This is a 2-factor authentication offering with OTP as one factor and biometrics (either iris or fingerprint) as the second factor for authenticating residents. v. Type 5 Authentication - This offering allows service delivery agencies to use OTP, fingerprint & iris together for authenticating residents
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15.	<p>People Hub Application Services System shall provide the following application services:</p> <p>a. Application for Establishing Identity – This application shall have the following modules:</p> <ol style="list-style-type: none"> Authentication of beneficiaries for enrolling them to schemes, and programmes. Aadhaar based authentication for ePDS scheme Confirming identity of beneficiary at PoS. Aadhaar based confirmation for ePDS Convergence/Aggregation service – PHID enabled convergence of beneficiary information across departments and schemes <p>b. Enhancing Efficiency in Service Delivery – This application service shall have the following modules:</p> <ol style="list-style-type: none"> Tracking Service Delivery - Enables tracking of a benefit or a request for benefit on an end-to-end basis. Accountability and Vigilance - Enables strengthening of accountability in activities relating to audit, inspection and vigilance through Aadhaar-based, and Non-Aadhaar authentication of the concerned officials along with time-stamping and GPS tracking. Empowering Beneficiary – Enables: <ol style="list-style-type: none"> Beneficiaries access government schemes in an integrated manner, to know all their entitlements Status of their current entitlements Lodge grievances <p>This module must be made available on portals such as MeeSeva and MeeKosam</p> <p>c. Verification of address and demographic details – This application shall have the following modules:</p> <ol style="list-style-type: none"> Address verification Verification of age and date of birth Propagating information about change of address to all concerned departments e-KYC services – This application shall provide instant, electronic, authentic data on: Date of birth, Age, Gender, Address and other basic information about a beneficiary to agencies or departments using <ol style="list-style-type: none"> Biometric authentication (for select departments only) OTP on mobile app OTP on website
16.	<p>People Hub shall provide report generation functionality for planning and decision support. For example, department specific:</p> <ol style="list-style-type: none"> Seeding progress report Demographic data verification progress reports Cancelled PHID report
17.	<p>People Hub shall provide user access management at different levels</p>

18.	People hub should be able to apply various matching algorithms to identify duplicates, and consolidate resident information across various departments in the state.
19.	People Hub should be able to apply Enterprise data lifecycle management policies for Data in the hub

4 Technical Requirements

S. No.	Technical Requirements
1.	Adopt Web-services Architecture and Service Oriented Architecture
2.	Leverage relevant e-Governance Frameworks like SSDG, NSDG
3.	Adopt relevant Industry standards like XML, JMS, SOAP and WSDL
4.	Compliance of relevant e-Governance standards
5.	Easy integration with middleware
6.	People Hub shall be able to interoperate and connect with applications deployed on heterogeneous platforms viz. AIX, HP-UX, Sun Solaris, Windows, Linux etc.
7.	Relational Database support
8.	Reusability - Services should be reusable
9.	Extensibility, ability to add new functionality without requiring major changes to the existing components
10.	Loose coupling, no direct form of communication between end systems except via published interfaces
11.	People Hub should support the following integration security standards: <ul style="list-style-type: none">• Authentication• Authorization• Encryption• Secure Conversation
12.	It shall adopt to Information Security Management System as per ISO 27001

5 Non Functional Requirements

5.1.1 Scalability

S. No	Requirements Description
1.	People Hub should be able to scale up storage and processing of storing and authenticating demographics, biometrics and Iris of population of AP
2.	People Hub should provide for scale-up on the CPUs, servers and storage in a horizontal fashion
3.	People Hub should support to achieve horizontal scalability (number of databases, users, connections etc.)
4.	People Hub should be able to scale up multiple terabytes in decentralized and centralized environment through “horizontal” sharing of data sources instead of depending on a central database server
5.	People Hub must be scalable so that it will continue to function as data sets change in size. Scalability capabilities must include: <ul style="list-style-type: none">a. Utilization of load sharing capability as provided by the underlying technical infrastructureb. Utilization of system virtualization capability as provided by the underlying technical infrastructure, andc. Processing of operations in parallel on a single and/or multiple hosts as necessary

5.1.2 Performance

The People Hub shall establish IT and network infrastructure to enable it discharge its responsibilities efficiently, complying with the relevant Service Level Agreements. Since People Hub is extensively used by most of the applications in the state, and many of them use it in real-time, performance becomes a critical element.

5.1.2.1 Response Time

Response time is the period between when the user invokes a service and gets response on the screen. The following table gives expected response times for different categories of services

S. No	People Hub Services	Response Time
1.	User Authentication and Authorization	< 1 Sec
2.	Services that just retrieve data	< 2 Sec
3.	Services that retrieve and/or manipulate data	< 4 Sec
4.	Aadhaar based services/Biometric Services	< 6 Sec

5.1.2.2 Transactions per second

Number of transactions per second supported by People Hub – ≥ 500 TPS

5.1.2.3 Concurrent User Support

The new state-wide enterprise architecture will contain around seventy applications, and about seven hundred and fifty services. Most of these applications will require resident information. Besides, the applications can be either on premise or cloud-based. At the minimum, People Hub must support to all these applications and services.

Expected key concurrent user support requirements are captured below:

1. Max number of users of People Hub Services per day–1 crore
2. Number of applications that can be serviced by People Hub at the same time – 60 (approx.)
3. Number of services that can be serviced by People Hub – 600 Services
4. Number of concurrent users – 10000 (assuming about 20 sec per transaction on an average)

5.1.3 Availability

S. No	Requirements Description
1.	Servers - People Hub shall ensure that Application, and Data servers are made available as set norm. People Hub may apply techniques such as clustering, load balancing, ensuring fewer restarts, Plug and Play hardware and software support, replication, Horizontal and Vertical auto scaling etc.
2.	Storage – People Hub shall ensure that adequate storage is available to meet needs to peak demand over an extended period of time. Techniques such as redundant storage, Object Storage, backups using SAN, Storage provisioning may be used.
3.	People Hub shall ensure high availability of the following applications. In particular, Authentication and Authorization services shall be made available 100% of the time. <ol style="list-style-type: none">a. Authentication and Authorization servicesb. Data servicesc. Application services
4.	People Hub shall ensure high availability of its Operating System
5.	People Hub shall ensure high availability of its infrastructure components
6.	People Hub system shall support load various options including balancing and clustering, where applicable, to ensure high availability of the system
7.	People Hub shall ensure that all IT and non-IT components shall be available in order to meet the required availability level
8.	People hub is a central system to refer critical records of it's citizen hence need to be available for 99.99% time.

5.1.4 Reliability

People Hub shall be a robust reliable system with a consistent performance in terms of:

S. No	People Hub Services
1.	Quality of Data
2.	Quality of Service
3.	Meeting Service SLAs
4.	Availability
5.	Security

5.1.5 Manageability

People Hub is required to cater to stakeholders across the state accessing it from multiple points and through multiple channels. Hence the manageability of this system is essential to ensure effective monitoring and timely resolution of any issues surrounding performance, availability and security

5.1.6 Software Maintainability

A system should be easy to manage and maintain. Which means maintenance effort must be less. Good software development practices, automating and reusing code, reducing lines of codes, and adapting modular architecture are recommended for improving manageability. People Hub shall ensure that the system software is easily maintainable.

5.1.7 Usability

People Hub shall describe solutions capability to support multiple user interfaces and any limitations to the ability to support major web browsers (i.e. Internet Explorer, Firefox, etc.) with a minimum of one version of backward compatibility from the last version release.

5.2 Business Domain Requirements

5.2.1 Audit

Logging and Exception management will help in tracing and troubleshooting specific problems. Logging may be required for fulfilling regulatory requirements as well. A Robust application will contain dual-purpose logs and activity traces for audit and monitoring, and make it easy to track a transaction without excessive effort or access to the system.

S. No	Requirements Description
1.	People Hub shall maintain log of all transactions that take place in the hub.
2.	Logs should be written once and be readable on multiple devices in a secure manner

3.	Logs should be backed up periodically to a permanent storage
4.	People Hub shall develop and apply Data Lifecycle policies to the Log files
5.	People Hub shall ensure security and confidentiality of Log data
6.	Logs should be useful for debugging, error reconstruction, and attack detection
7.	Logs shall capture audit trails to a secure location
8.	Exception messages shall ensure that no unintended information, which could compromise data, is displayed
9.	People Hub shall always be fail safe

5.2.2 Personalization

If data is captured in local language only, then People Hub must have capability to translate them to English and process along with other data.

5.2.3 Search Capabilities

People Hub maintenance portal shall have capability to search using key words associated with People Hub. Typical search items include – documents, manuals, reports, procedure, technical and functional specifications etc.

5.2.4 Customization

A COTS or a Cloud based solution may require significant amount of customization to meet the requirements of People Hub. In general, lower the customization, better it is from the point of view of maintenance, support, and cost. The following aspects of customization must be considered

1. Business Rules Customization (Particularly for Authentication and Authorization service)
2. Workflow Customization
3. Report Customization

5.2.5 Security, Access Control, and Privacy

S. No	Requirements Description
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1.	The following principles govern the assurance of the privacy of personal information: <ul style="list-style-type: none"> a. Notice—residents should be given notice when their data is being collected. b. Purpose—data should only be used for the purpose stated and not for any other purposes. c. Consent—data should not be disclosed without the resident’s consent. d. Security—collected data should be kept secure from any potential abuses. e. Disclosure—residents should be informed as to who is collecting their data. f. Access—residents should be allowed to access their data and make corrections to any inaccurate data. g. Accountability—residents should have a method available to them to hold data collectors accountable for not following the above principles.
2.	Personal information can only be processed in the following circumstances only: <ul style="list-style-type: none"> a. for specified explicit and legitimate purposes and not in a way incompatible with those purposes; b. when processing is necessary for the performance of a task carried out in the public interest; c. when processing is necessary for compliance with a legal obligation;
3.	Personal information may be processed only insofar as it is adequate, relevant and not excessive in relation to the purposes for which they are collected and/or further processed.
4.	The personal information must be accurate and, where necessary, kept up to date. Every reasonable step must be taken to ensure that personal information which is inaccurate or incomplete, having regard to the purposes for which they were collected or for which they are further processed, is deleted or rectified.
5.	The personal information in the custody of the People Hub or any other body, which is a part of the People Hub, shall not be transmitted to any other body or person without the appropriate legal authority.
6.	Encryption requirements must be identified and applied where relevant. For example: Passwords

5.2.6 Environmental Requirements

People Hub shall support production, pre-production, testing and development environments in line with best practices. This will ensure that quality of the software is maintained, and a standard procedure for software change deployment is enforced. Other benefits include – reduced production incidents, early identification and resolution of defects, reduced data security incidents etc.

The pre-production, test, and development environment shall mirror production environment, and

efforts must be made to keep them in synch. However, data in production and pre-production shall not be replicated to test as is, or if it has to be replicated, exceptions will have to be obtained and non-public information be scrubbed.

5.2.7 Configuration

Configuration of a COTS product incorporates business rules, workflows, best practices and standard procedures of the government into the COTS product. Configuration in line with the strengths of COTS product ensures real value from it

6 Security Requirements

People Hub information assets and operations should follow the well-defined Information System Security policy. Governance system should be in place to track and audit the system with respect to security policy adherence. To achieve the objective of Information system security policy the following information security processes will have to be considered and followed:

Component	Comment
Identification	the process of distinguishing one user from all others
Authentication	the process of identifying the identity of the user
Authorization and Access control	the means of establishing and enforcing user rights and privileges
Administration	the functions required to establish, manage and maintain security
Audit	the process of reviewing and monitoring activities that enables the reconstruction and examination of events to determine if proper procedures have been followed for all of the above

6.1.1 Key Security Considerations at the Application & Database level

To maintain information security during transaction the developed application should support both HTTP and HTTPS (SSL certificate to be deployed by the vendor on the Web/ Application Server for the entire project duration). The Application/Database must have integrated security/ monitoring features with the following:

S No.	Details
1	LDAP integration of seamless access and better control on user management
2	Firewall to filter unauthorized sessions/traffic
3	Intrusion Prevention System to detect/prevent unauthorized activities/sessions
4	Server –to-server communication encryption
5	Secured/ encrypted storage of data/ data elements in the Database & DB Backups
6	Comprehensive logging & audit trail of sessions and transactions
7	Clear definition of Roles and Users
8	Define Role-wise add/ edit/ view/ delete rights for each Entry Form/ Report in all modules
9	Digital Time and User Stamping of each transaction

6.1.2 Key Security Considerations at the Network / Transport level

The following are key security considerations at network and transport level:

Component	Comment
Network Link Encryption (IPsec)	Need to put a network layer security with encrypt IP packets by IPsec as main protocol and routers encrypt and decrypt unnoticed by higher layers
Encrypted HTTP session using SSL (HTTPS)	Transport Layer Security should be used and implemented by encrypt sessions and messages with the help of SSL. It can control the communication between web browser and server and entities identified by connections, port numbers

6.1.3 Application Layer Security

Component	Comment
Message Format	Application layer security should be added to standard message formats (e.g. S/MIME)
Authentication	Authentication of sender and data should be in place
User keys/password	Enforcement of end users keys and password should be in place
End-to-end security	End to end application layer security should be in place

6.1.4 System must comply with IT Security configurable requirements

Component	Comment
Multifactor Authentication	Proposed system should supports multifactor authentication like OTP, Soft Token, etc.
Display last login/logout	System should support to shown the last login/logout details to control and self-monitor the security.
Password criteria restrictions	Password must be complex and should be combination of upper case character lower case character and special character
Password Length (Minimum and Maximum)	Password length must be at least 8 character long
Password change interval	Password must have change mandate and should be asked for change after 30 or 45 days
Password change history (password cannot be repeated)	Changed password must not be reused for at least past 5 password for high security
Login session timeout	login session must be timeout every ideal 2 minutes interval to avoid miss use of logged in systems
Disallows concurrent login sessions	Security and auditing required to blocking for concurrent login sessions.

Component	Comment
Allows password encryption during transmission	Encryption must be in place during password transmission for reset user password

6.1.5 Security Review

S No.	Details
1	The People Hub developed/customized shall be audited by the agency from a security and controls perspective. Such audit shall also include the IT infrastructure and network deployed for the project. Following are the broad activities to be performed by the Agency as part of Security Review. The security review shall subject the solution to the following activities.
2	Audit of Network and Application security mechanisms
3	Assessment of authentication mechanism provided in the application /components/modules
4	Assessment of data encryption mechanisms implemented for the solution
5	Assessment of data access privileges, retention periods and archival mechanisms protected.
6	Application security features incorporated etc.
7	Application Security mechanisms should be accessed in compliance with the IT Act 2000, 2008 Amendment and IT rules 2011, such that it maintains data/information Integrity, Confidentiality, Non-repudiation.
8	Audit of Security mechanisms so that they are in compliance with the latest Guidelines by Controller of Certifying authority (CCA), IT Act, and ISO27001.
9	Gap assessment of certain controls like say ISO 27001 and section 43, 47, 66, 69, 79, 84 and 87 of IT ACT amendment 2008 and decide how the sensitive data from a data centric stand point is to be protected.
10	Overall security of the solution including installation and management of Antivirus solution for protection of all the servers and systems implemented for the project, application of updates/patches etc. The antivirus patches have to be updated and applied from time to time, after appropriate testing of the patches in the staging area.

7 Operational Requirements

7.1 People Hub Operational Requirements

7.1.1 Training Plan

First, training need analysis of all key stakeholders has to be done and then training plan will have to be developed in line with overall project plan. Given below are high level requirements of Training plan.

1	Stakeholders shall be trained on user screens, basic functionalities, navigating screens, and operations that can be performed, as relevant to user types
2	Where necessary, relevant case studies may be given
3	Basic IT Skills, using cloud based application, and other basic training may be given on a need basis.
3	Detailed training plan shall be created, and training material shall be prepared and distributed to the participants
4	Training plan shall include details like participant names, training location, date, and time. And all necessary arrangements shall be made to enable smooth running of sessions
5	At the end of training sessions, assessments will have to be performed in order to evaluate the level of understanding of the participants. Assessments may be in the form of quiz, tests, or real-life simulation. All necessary arrangements, including preparation of test materials, administering tests, and evaluating test reports must be planned and done in advance.

7.1.2 Training Deliverables

The required training should have below:

S No.	Details
1	Training Plan
2	Training Manuals, User Guides and Materials
3	Documented Evidence of Successful User Training

7.1.3 Necessary Training

To provide necessary Training to GoAP department users and all stakeholders on

S No.	Details
1	Proposed Integration processes
2	The products and services of the people hub

S No.	Details
3	The Information security and their relevance and importance to the department data confidentiality
4	Knowledge of departmental systems, operational procedures etc.
5	System Administration training to IT Operation Management Team

7.1.4 Training Responsibility & Duration

The SI would have to adhere to the 'Capacity Building and Change Management Plan' provided by APTS.

Training shall introduce the GoAPresources on systems, procedures and processes in an elaborate manner. The actual requirement of training may be assessed while implementing the people hubservice and will be decided mutually by Government designated team and vendor. Concept of Trainer's Training program will be organised by Government designated team to train the trainers of the SI on people hubproducts and services, processes etc.

The expected duration for the training is 10 -15 days. Based on the training need, people hubSI has to develop the training material. SI would have to maintain the repository of the material and would have to train service agents on account of general expansion or attrition. Trainings which are not related to functionality of the process and client applications would have to be provided by the SI itself; this will include soft skill training, technical training on general application usage and applications provided by vendor.

7.1.5 Change Management Plan

Change management initiative shall focus on addressing key aspects of project including building awareness among stakeholders. Change management shall also include development and execution of communication strategy for stake holders.

Change management workshops shall be planned and conducted based on needs of various stakeholders of people hub. Key considerations for Change management process are given below:

1	Impact assessment – In the light of changes, how are current functioning, Org structures, roles and responsibilities are impacted.
2	Assess change readiness – How ready departments and stakeholders are? Are there potential blockers? Stakeholder issues and concerns etc.
3	Design change management approach – This is to come up with an optimal way of implementing people hub (Phases, pilot groups etc.) and time frames
3	Develop change plan – This includes creating plan, identifying milestones, developing benefit tracking mechanisms
4	Method for ensuring a successful change management program

5	Communication and planning
6	Define change governance – including appropriate decision making and review structures
7	Lessons Learned regarding change management challenges as they will impact this project

A special consideration will have to be given to Change communication strategy, planning and execution Given below are recommended steps are listed below:

1	Conduct a Baseline Communication Assessment
2	Develop and validate Communications Strategy
3	Develop and Validate Communication Plan
3	Implement Communications Programs
4	Measure Results of Communication plan
5	Adjust Communications Program

7.1.6 Service Delivery Requirements

The Vendor agrees to provide Services to people hub,conforming to the specified Service Levels, which will ensure:

S No.	Details
1	Delivery of speedy and efficient services to the Citizens, and the people hub users in relation to all the related services
2	Train the existing department users/employees to assist them discharge their duties effectively and efficiently
3	Encourage and help to improve the adoption rate for the usage ofthe people hub services, by employing traditional as well asinnovative techniques. To that end, implement measures: <ul style="list-style-type: none"> a. for making it convenient for users to utilize the services, b. educating the users in the relevant procedures

To meet the aforesaid objectives the vendor will provide the ServiceLevels in accordance with the performance metrics as more particularlydescribed in Nonfunctional requirement's performance section.

Vendor should develop the Standard Operating Procedures (SOPs), in accordance with the ISO 27001 & ITIL standards, for people hub. These SOPs shall cover all the aspects including Infrastructure installation, monitoring, management, data backup & restoration, security policy, business continuity & disaster recovery, operational procedures etc. The vendor shall obtain sign-offs on the SOPs from the

department and shall make necessary changes, as and when required, to the fullest satisfaction of GoAP.

7.1.7 Operations and Maintenance Requirements

The vendor shall be required to provide operational and maintenance services for people hub including, all the connected software and integrated components. This section discusses the Operations & Maintenance services to be provided by vendor with respect to Application Software & supporting IT Infrastructure Management.

S No.	Details
1	There should be a minimum number of System Management Tools required to manage and administer the proposed people hub solution.
2	Vendor should be able to integrate new systems using people hub in <TBD> time
3	Vendors should propose an integrated management solution wherever possible. The cost associated with this element of the solution must be provided with line item pricing.
4	Vendor should provide the operational support on people hub for next <TBD>.
5	An access method is required so trained personnel can perform standard software changes and run basic diagnostic checks to the system(s), including the capabilities listed in "System Maintenance, Upgrades and Diagnostics".
6	The system(s) must support pre-programming of tasks and be capable of scheduled execution at a later time.
7	System administration must be accessible via LAN or WAN for those with security authorization.
8	The proposal must include the equipment, software, and training required, along with a description of the software used, for administration.
9	The system administrator(s) must be able to build and modify tables and other system features; and to print reports concerning such database information.
10	The system(s) must be designed so that routine maintenance procedures, troubleshooting, loading hardware and software revisions, patches, etc., can be performed without taking the system(s) out of service. Routine maintenance functions must be performed without causing any downtime for the system users.
11	The core system(s) should use self-diagnosing software for detecting and logging of component failures. It should have the ability to initiate an alarm that can be sent to the support Vendor and the people hub operational technical personnel by phone/SMS and email.
12	The system management solution must include a mechanism to monitor, measure, and troubleshoot system and generate system performance reports.
13	Diagnostic reports and software programming should be available remotely (via a browser and VPN).

S No.	Details
14	All default passwords for remote programming access must be removed or changed, with a summary of changed passwords delivered in writing.
15	The Vendor is expected to keep current on changing policies, new funding streams, innovations and best practices. In, addition, the Vendor can describe any other value-added services it can provide in addition to those specified within the RFP. It is the Vendor's responsibility to inform the State, and enrolled providers if appropriate.

8 Acceptance Testing, Audit & Certification

The primary goal of acceptance testing, audit and certification is to ensure that the people hub system meets requirements, standards, and specifications as set out in this document and as needed to achieve desired outcomes. The basic approach for this will be ensuring that the following are associated with clear and quantifiable metrics for accountability:

- a) Functional requirements
- b) Infrastructure Compliance Review
- c) Availability
- d) Performance
- e) Security
- f) Manageability
- g) SLA reporting system
- h) Project Documentation
- i) Data Quality Review

9 Enterprise Architecture

9.1.1 Business Architecture

9.1.1.1 User Scenarios

Indicative user cases are given below

SI no	Use Case
1.	Welfare department using People Hub Services to determine various benefits availed by citizens, and also to check their eligibility for certain schemes
2.	Departments using People Hub services to authenticate ePDS beneficiaries using Bio-metric services at Points of Sale
3.	Banks using People hub e-KYC (Know your Customer) services before opening accounts
4.	Revenue department using People hub to link Land records to right owners, Pattadars, and enjoyers etc.
5.	Residents using People-Hub Self-service portal to update their address information
6.	Colleges using People hub to retrieve student demographic, socio-economic, and digital locker information
7.	Agriculture department using People hub to retrieve farmer demographic and socio-economic data, and using data from People hub to get other information like condition of farmer's land, produce, pending loan, and welfare schemes he is part of etc., to provide help and advice – economic, expert advice, loan waiver, marketing.
8.	Government using People hub data to identify beneficiary and his/her bank account to disburse payment
9.	EduGov application updating People Hub with student demographic and socio-economic data
10.	EduGov application using People Hub to retrieve student demographic and socio-economic data for enrolment to a course
11.	Patients registering themselves in e-Health and availing any-where any-time services
12.	Hospitals accessing patient health records through People hub
13.	Departments using People Hub id to track status of Citizen service
14.	Departments or agencies using People Hub address verification service for verifying address of a service consumer
15.	Departments using Demographic data verification service to validate date of birth of a service consumer
16.	Near real-time propagation of demographic data changes/addition in department database to People Hub thru Message based Architecture
17.	Near real-time seeding of people hub id to department database

18.	Food and Civil supplies department using Aadhaar based accountability and vigilance services to maintain traceability of actions taken by officials in PDS distribution chain, and ensure that supplies are tracked from point of procurement to point of delivery complete with people who are responsible at each stage of the chain.
19.	Resident name change event should trigger an approval workflow in concerned departments. Upon approval, the new name gets updated in the departmental database. Nightly batch will update this in People Hub
20.	In the event of death of an individual, health department records will be updated. Upon review and approval by authorities, data is transmitted to the hub. The hub will then trigger workflow to update this information in various departmental databases, and also certain trigger certain common services (disenrollment from benefits, etc.)
21.	New born babies are registered in hospitals without names and birth certificates are issued. The birth certificate will be linked to parent's (both) PHID. This data is transmitted to People hub where the record resides without a name. Once the baby is given a name, parents will visit nearest Help desk centre, produce original birth certificate and update the child's name. People hub is directly updated, and a demography update event is registered. This will result in propagation of data to Health department where the medical record is updated with child's name
22.	In the event of orphanage, the baby's identity will be linked to the Orphan home state legal ID with other details viz. ascertained date of birth, given name and later be appended with adopting parents PHID.
23.	Migration – When a citizen migrates to another state, citizen will be able to register new address by filling e-KYC or by authorized agencies. Once the address is updated in PDH, respective department databases will be updated with state residency status. Alternatively, any address update in UIDAI reflecting demography changes or gas connection will also update residency status in PDH. If Passport application or change of passport address is applied for, state police and home department will be able to update residency status in PDH while processing police clearance certificate.

9.1.1.2 Services

Given below are People Hub Services portfolio. They can be broadly classified as:

1. **Data Services** – Create/Read/Update/Delete (CRUD) Services which can be invoked for Data manipulation, and ID seeding– People Hub Id or Aadhaar Id (for select departments only).
2. **Application Services** – Given below is an indicative list of People Hub Application Services. They are broadly segregated under:
 - **Resident Information Services**
 - **e-KYC service** provides an instant, electronic, non-refutable proof of identity and proof

of address along with date of birth and gender.

- **Convergence Service** provides 360 degree view of the resident across all departments
- **Authentication Services:** Provides both Aadhaar (Biometric) and Non-Aadhaar Authentication Services (OTP & Challenge Question based)
- **Beneficiary Verification Services:** Services used to check if a given beneficiary is eligible for enrolling in a given scheme, and also verify him/her at PoS.
- **Service delivery tracking services:** enables tracking of a benefit or a request for benefit on an end-to-end basis, and provide transparency both to the department and to the beneficiary.
- **Accountability and Vigilance Services:** enables to strengthen the accountability in activities relating to audit, inspection and vigilance through Aadhaar-based authentication of the concerned officials along with time-stamping and GPS tracking.
- **Verification Services:** Address and demographic data verification services
- **Scheme enrolment, and disenrollment services:** This service will enrol or dis-enrol citizens from Department schemes.

3. **People Hub Internal Services** – These are Hub services and manage various key functions of hub like match-merge, Life cycle management, Workflow management, unique id management etc.

People Hub Service Portfolio is illustrated here

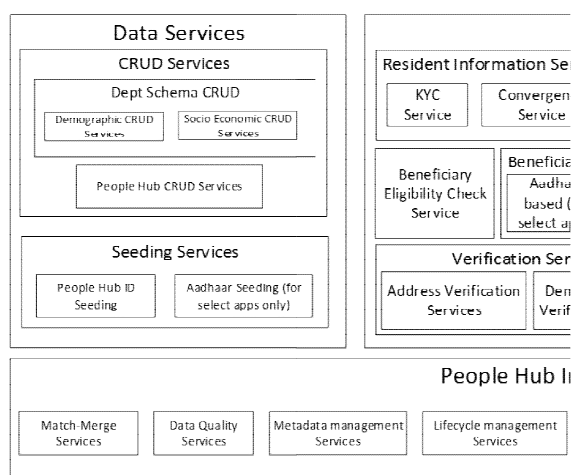


Exhibit 1 People Hub Services

9.1.2 Data Architecture

9.1.2.1 Data Integration View

The People hub is designed considering requirements of new e-Pragati eco-system, where it is one of the core components. It is designed to support a number of applications by providing resident data and services. People hub follows co-existence MDM Architecture pattern where resident master data is managed by the hub in real-time (or near real-time) but data authoring remains distributed (departments)

The near-real time integration is enabled by Event-based architecture (blue colour arrows in Exhibit 2) below). Event based architecture will ensure automatic propagation of changes across all relevant departmental databases and the People hub. Two such examples are shown in Exhibit 2. They are:

1. Real-time seeding of People hub id, and propagation of Demographic data changes to departments
2. Real-time propagation of Demographic and benefits data from Department databases to the People hub

People Hub must have most current and reliable data. Only then applications can use the data for transactions. Therefore, real-time or near real-time data synchronization between Department databases and People hub is necessary, at least for certain select data attributes. Event-based Architecture will ensure near real-time data synchronization. Besides, batch reconciliation process will

load delta departmental records to the hub to keep them in synch. The batch process will also be used to load Smart pulse survey data to People hub.

People Hub application and data services are published to a service directory. A Service broker will enable interaction between service requestor and service provider (People Hub)

e-Highway is a key component in Integration. It supports Event-based architecture by providing Publish-Subscribe (Pub-Sub) and messaging facilities, and service oriented architecture by providing service directory and broker functionalities.

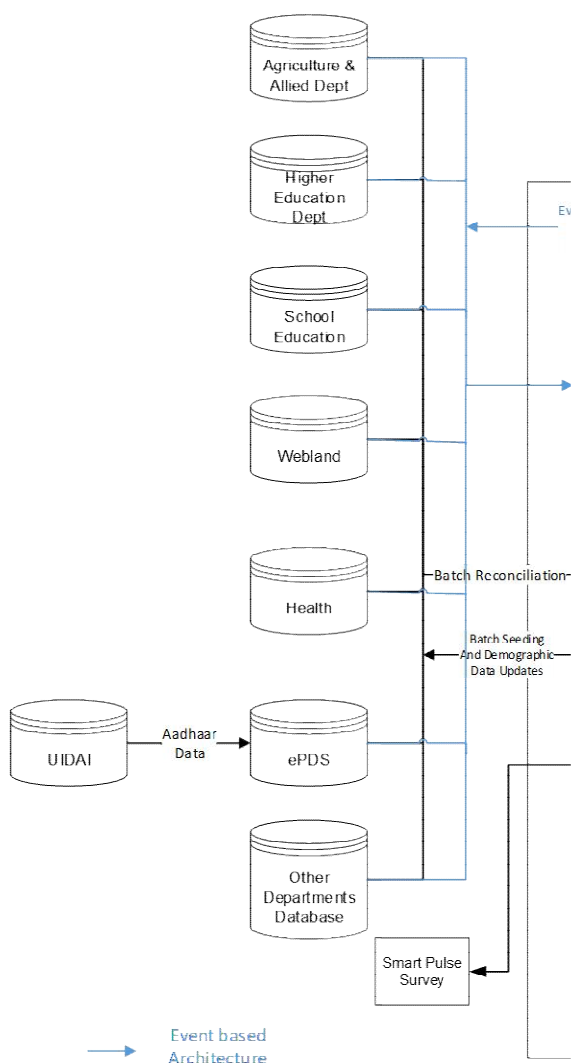


Exhibit 2 People Hub Database Integration view

Key components of People Hub Architecture are described below:

1. Self-Service PH Application: This application will be used by citizen to change or request for changes in demographic data by submitting relevant documents online.

2. External Agencies Application: External agencies viz, Banks eKYC, Electricity distribution company and other government authorized people facing agencies will be able to access PDH services integrated in their own application and shall be able verify PDH records.
 3. People Hub Application Services: People Hub Application Services are portfolio services hosted on eHighway. This component expose application services to all department and authorized external application. The appropriate application authentication and authorization shall be integrated into this component.
 4. People hub data services: Data services are CRUD Services and can be used either by applications or Database objects like stored procedures etc. They should not contain business logic People hub shall be able to provide data access to application services for referring, validating and updating PDH database
 5. PH Database: A repository as single source of truth for citizen's demographic and socio-economic data.
 6. People hub Internal Services:
 - a. Match-Merge: This service will refer the incoming data from various departments and uniquely identify individuals using various department data using specialized algorithms and create a 360 degree view of Residents.
 - b. Data Life-cycle management: Data lifecycle management service will identify data access rate and rank/tier the sparsely accessed records or evaluate citizen living status to determine and move records for archiving or deleting.
 - c. Metadata Management: This internal service is apply enterprise level metadata rules and policies viz. Data type, description, source, defaults, acceptable values, author and which sources/applications are authorized to modify data element etc. It will also protect the repository from potential errors of maintaining copies of the source metadata by accessing up-to-date metadata from all system metadata in real-time.
 - d. People hub ID generation and management: This service caters to critical function of generation, management, and deletion/recycling PHID in the master table.
 - e. Data Quality Services: This service will validate, flag, and if necessary substitute default values, reformat etc., ensure that the data accessed in automated and interactive ways
-

conforms to the integrity and quality of data.

7. Smart Pulse Survey (SPS): Smart pulse survey is an initiative by AP government to capture records from citizen by conducting door-to-door survey. Representative from government department will conduct the door-to-door survey and capture citizen's data via handheld device viz. Tablet PC's. The smart pulse app will use PH application service to populate demographic data and also verify/rectify records in survey database. Data in SPS database will contain a link to PH referring PHID. If necessary, seeding services will be invoked to seed the data this service will capture the demographic, socio-economic and biometric records and upload into PDH database in real-time.
8. Staging Area: This component will store the raw heterogeneous source of records and shall implement data cleansing rule engine and ETL service to load records as master into PH database.

The departmental databases contains the demographic and socio-economic data. These records will be used to populate the PH master data. Departmental records have department specific citizen ID and this IDs will be mapped to PHID during the migration phase. Post-migration, all departmental records will be seeded with PHID to achieve a uniform identity of each citizen. The departmental databases have scheme related records and these records shall also be populated into PH database to achieve 360 degree view of a citizen.

9.1.3 Application Architecture

9.1.3.1 Logical View

People Hub Application architecture is illustrated below. Key aspects of the architecture are:

1. Layered Architecture
2. Integration is achieved through e-Highway

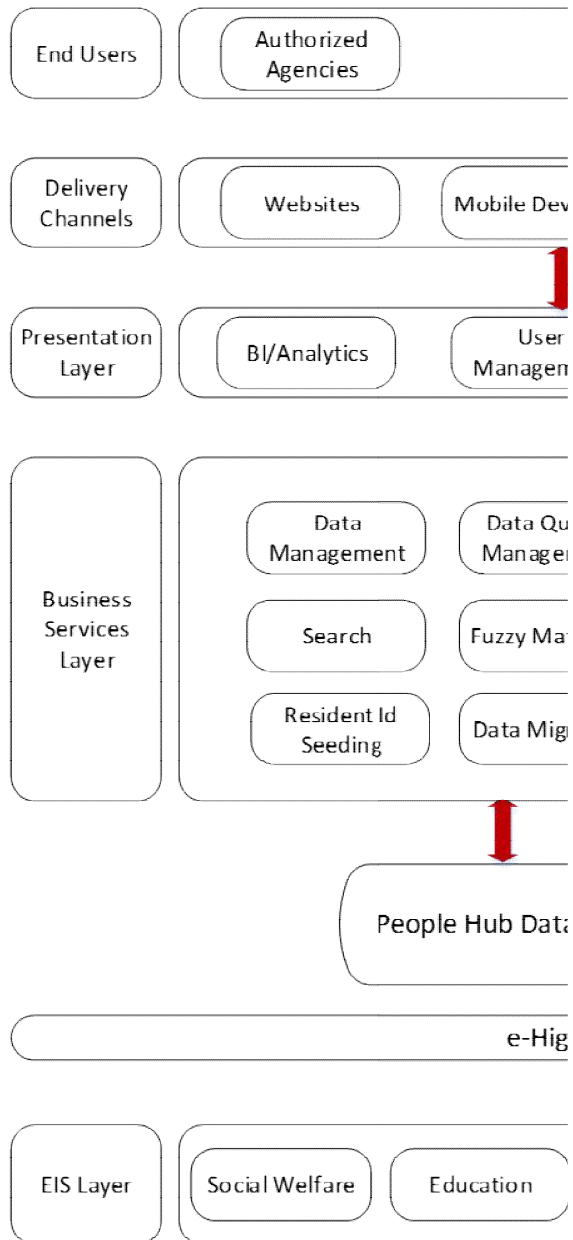


Exhibit 3 People Hub Application Architecture

Given below is a depiction of the Logical Architecture of People Hub. The diagram shows how various components, systems, and sub-systems are logically aggregated into 6 main groups. These groups form the core elements of the People Hub. A detailed description of each of the group is given below

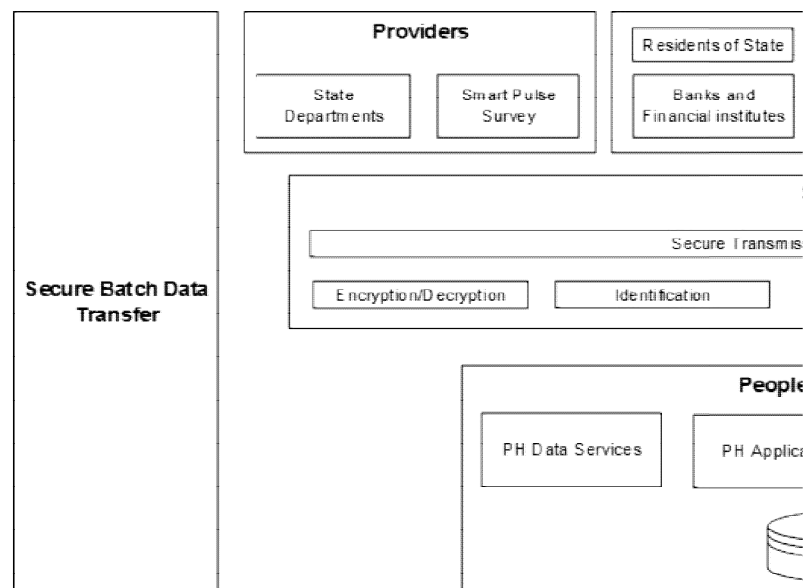


Exhibit 4 People Hub Logical Architecture

1. Consumers

The end users for People Hub are departments (internal) and Agencies/residents and others outside the State IT ecosystem (external). The people hub, which contains resident data can be accessed via browsers or applications. The user requests are routed to the right service by e-Highway, which also ensures that the data is accessed in a secure manner.

2. Security Layer

The security layer is to protect the hub and its components from external and internal attacks, and ensure that only right people can access right information. This layer is used for Identification, Authentication, Authorization, and Secure Batch transmission processes. There is also a mechanism to ensure that the both server and client are validated before data is transmitted between them.

3. Providers

Providers supply data or services to People Hub. Major providers of People Hub are:

- a. Departments: They provide resident Demographic data
- b. Smart Pulse Survey: Provides resident Socio-economic data

4. e-Highway

The e-Highway is one of the major components of the Architecture which provides services like routing, translation, Service directory, and repository. This enables Service oriented architecture and loose coupling between various components in the State Government eco system.

This SOA platform will help in data exchange in real-time mode, ease up maintenance and change management, and facilitate scalability through aggregation of services. Further, it ensures modularity and close alignment of services with business processes. Further elaboration on e-Highway is out of scope of this document.

5. Secure Batch Data Transfer

PHID data, Pulse survey data, and probably some department level data too, will be transmitted to People Hub thru batch ETL process. The batch process should be secure and comply with security requirements of APSEA and Information Security Management System (ISMS).

6. Consumers

People Hub database will serve as the single source of truth for its data consumers. The broad identification of such consumers are Residents of State, Banks and Financial Institutes, Various government departments and agencies, Central Government and Agencies, Public Service providers, Private institution providing healthcare, education, social services to state residents.

9.1.4 Technology Architecture

9.1.4.1 Network view

The Exhibit below shows the high level architecture as part of the cloud enabled network architecture. The core network layer will be controlled and managed by the service provider. The aggregation layer is where People Hub security/data centre services will be split between the DMZ and the core/internal network. The access switches are the switches providing physical connectivity to the network devices, servers, storage, etc. The compute block is where virtualization works and all servers are part of the compute block. Storage and SAN services are also a part of the compute block where integrated or custom solutions are provided. The switch and Virtual machines are logical components of the compute block.

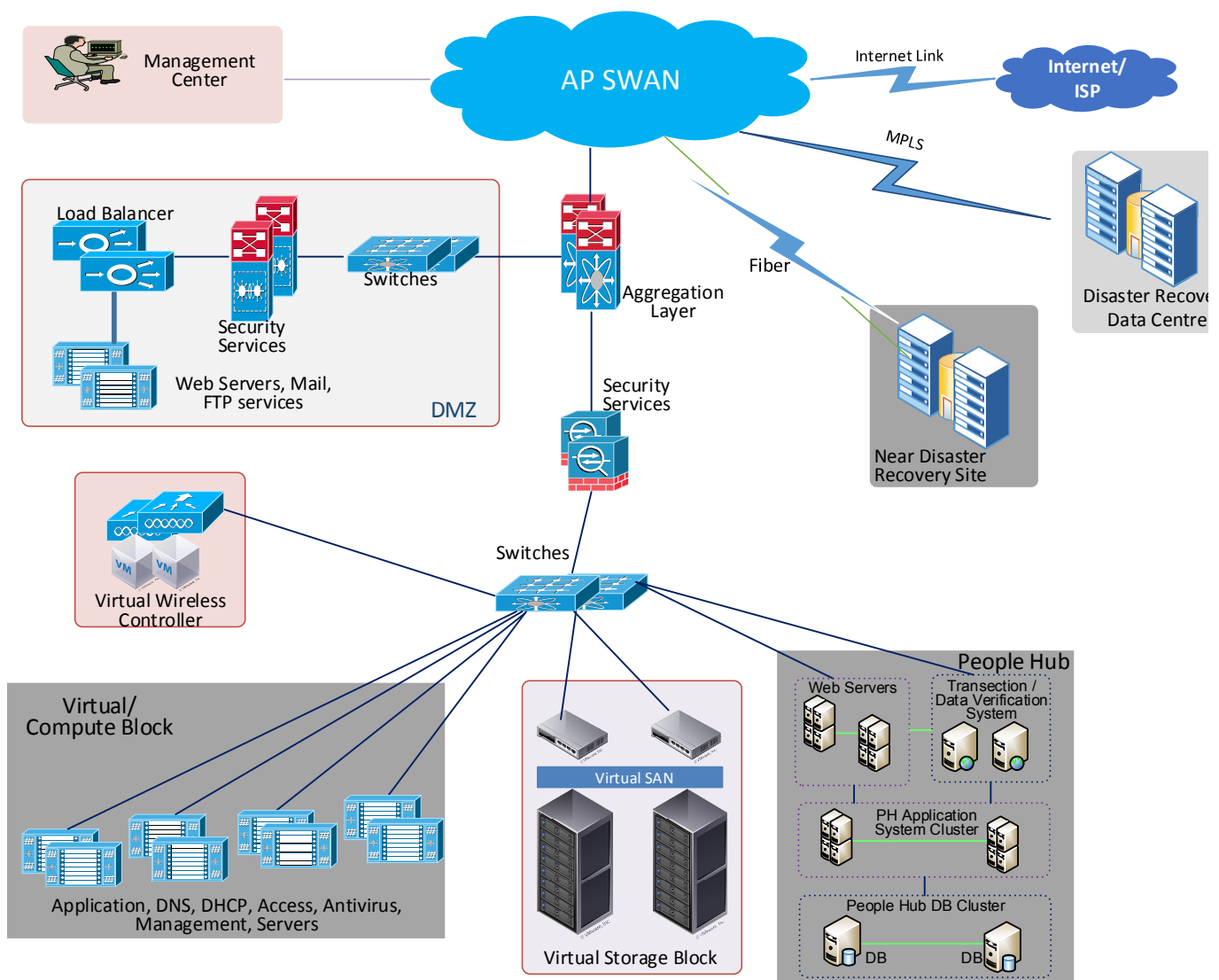


Exhibit 5 People Hub Network view

Component	Comment
Internet/ISP	This is the internet/ISP peering where citizen /consumers/ agencies can access the services hosted in the State Data Centre
Management Centre	The IT team should manage the IT components of the cloud, existing data Centre's, DR from outside the cloud Centre
DMZ	DMZ or demilitarized zone (sometimes referred to as a perimeter network) is a physical or logical subnetwork that contains and exposes an organization's external-facing services to a larger and untrusted network, usually the Internet
Security Services	This is the layer where the core Data Centre network and the DMZ is separated and an additional layer of security is introduced. This also forms a part of the perimeter security
Virtual/Compute Block	These are bundled solutions consisting of integrated, tested and validated multi-vendor server, virtualization, networking and storage resources for the virtual and cloud
Virtual Storage Block	This is the storage virtualization block which is the amalgamation of multiple network storage devices into what appears to be a single storage unit
Disaster Recovery	The DR/BCP site will hold the applications in High availability
Near Disaster Recovery Site	It will have fiber connectivity with core data Centre and have near real time replication enabled. It can help to achieve near zero RTO and RPO.
AP SWAN	The connectivity to all the existing Centre's, offices, and to the Internet will be via the existing SWAN network which after the implementation of NOFN will be available at the panchayat level

9.1.4.2 Deployment View

The People Hub indicative technology Architecture is shown below:

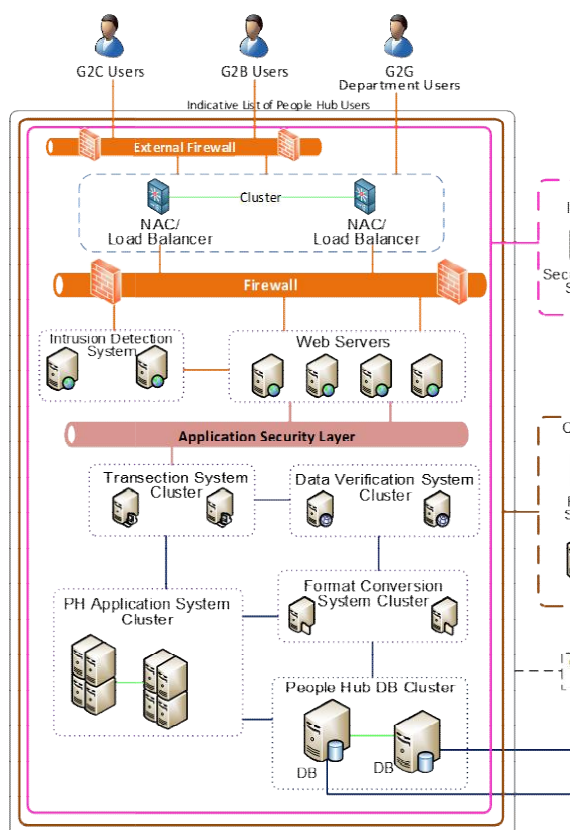


Exhibit 6 People Hub Deployment View

Component	Comment
NAC/ Load Balancer	<ul style="list-style-type: none"> • Network access control (NAC) restricts the data that user can access, as well as implementing anti-threat applications such as firewalls, antivirus software and spyware-detection programs. • Load Balancer will help to manage the load and provide the scalability for increasing backend servers • It may provide load balancing services for scalability and availability
Internal & External Firewall	<ul style="list-style-type: none"> • All internet traffic would be routed through firewall. • The firewall would focus on preventing external users accessing the internal network and limiting what internal users can do • It would help in improving the integrity of network
Intrusion Detection System	<ul style="list-style-type: none"> • Intrusion Detection and Monitoring system is used to detect any suspicious activities as well as monitor the network traffic and system activities

Component	Comment
Web Servers	<ul style="list-style-type: none"> The Web Servers represent the last point that the Customers can connect to. The web application will determine whether the network traffic needs to be forwarded to Transaction Servers or not. This will provide additional layer of security.
Transaction Servers	<ul style="list-style-type: none"> Transaction Servers will handle all on-line transactions for customer registration and maintenance, on-line ordering and processing. When customer requests are passed from the Web Servers to the Transaction Servers, the Transaction Server will update the customer profile with an order number and, for the case of public users, generate a Demand Note to be downloaded by Customer.
Data Verification System Cluster	<ul style="list-style-type: none"> Data Verification System should use the GIS software to support and verify the predefined multiple digital data formats in the system. On a need basis, the Lands Hub user can use this system to manually perform the following activities: <ul style="list-style-type: none"> a. Verification and maintenance on the source spatial data b. Verification and maintenance on the converted PH data c. Verification on the CSU data file which is provided by departments.
Format Conversion System Cluster	<ul style="list-style-type: none"> The Format Conversion system should be used to perform format conversion utilities that run on Microsoft Windows platform for converting PH and CSU data into the required formats such as DWG, DXF, DGN and XML etc.
PH Application System Cluster	<ul style="list-style-type: none"> The PH Application System will extract and store a copy of PH data from the master set of the current mapping libraries in PH system connected to the People Hub DB system.
People Hub DB Cluster	<ul style="list-style-type: none"> People Hub DB Cluster will be core database and should be connected with external Storage system
Identity & Access Management (IDM)	<ul style="list-style-type: none"> Identity and Access Management would provide Authorization, Authentication, Multi-factor authentication, Federation Management Server, Fraud Prevention System. It would leverage existing LDAP Directory Services to identify user's credentials. APp Store should contact IDM for multifactor authentication which could be an OTP, RSA Soft token or a security question.
Centralized Monitoring System	<ul style="list-style-type: none"> Centralized Monitoring System would manage and monitor all enterprise systems and IT Infrastructure components. It would provide real time alert/notification & dashboard for analysis and performance management.
External Storage (SAN)	<ul style="list-style-type: none"> It is recommended to use an enterprise wide external storage like SAN to keep organization level data at centralize place to avail benefits like flexibility, availability and performance in accessing application data. SAN storage devices may include tape libraries, and, more commonly, disk-based devices, like RAID hardware.

Component	Comment
Centralized Backup Solution	<ul style="list-style-type: none"> People Hub should be connected to Centralized backup system and core team can run the backups as per required schedule.

9.1.5 Security Architecture

People Hub should be in line with the Enterprise Security Architecture as shown below and will follow an organization's security processes, information security systems, personnel and organizational sub-units, so that they align with the organization's core goals and strategic direction. People Hub should have security option to link with key components of Enterprise Security Management are Access Management, Identity and Credential Management and Single Sign-On.

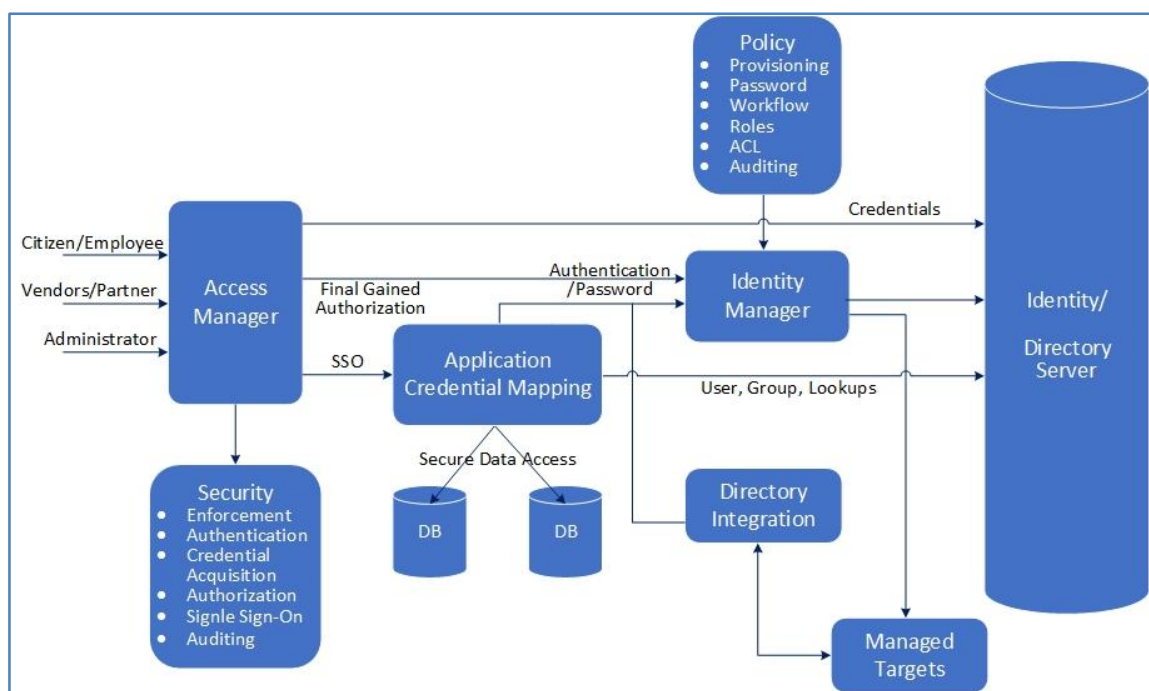


Exhibit 7 Enterprise System Security Architecture

Component	Comment
Access Manager	User will be get access as per defined policy
Application credential Mapping	This application will map the SSO with back end application credentials
Identity Manager	Will manage the user identity
Directory Integration	This will integrate user credential with Directory Server
Directory Server	Collection of User identity and active directory server
Policy	Place to defined policy for the system
Security	This will enforce the security in systems

Component	Comment
DB	Manage the Credential Database

Exhibit 8 Components of Enterprise System Security Architecture

9.1.5.1 Access Management

People Hub should have access management system in place to have option to integrate with existing enterprises access management system to provide seamless authentication and authorization solution for People Hub at Web/Application and Database level. Access Management system will enables enterprise to control user access to protected information and resources. It should provide a wide range of built-in authentications and supports external authentications as required in People Hub. Access Management Authorization service should allow to provides permit and deny decisions on access requests for applications.

9.1.5.2 Identity and Credential Management

Expecting high user base for People Hub, who will allowed to access information from the system and effectively managing user identities throughout their lifecycle is even more important. System should have option to get integrated with automated identity management system to helps enterprises ensure the right people can access the right applications and infrastructure.

10 Bill of Materials

The following sections describe minimum bill of materials includes generic, hardware, software and service specifications.

10.1 Generic Requirements

1.	The vendor shall provide a single integrated system (comprising of compute, storage, networking, and software components) that is optimized and tuned to provide maximum performance, scalability, and efficiency for people hub
2.	The hardware and software configuration must be built to protect against component failures such as disk failures, CPU failures, memory failure, network card failures, and system controller failures.
3	The proposed system should have an integrated management and monitoring system from disk to applications.
4.	The proposed system should have a unified patching approach where a single release should patch the entire system viz firmware, Bios, OS, Server, Network and system software's.
5.	The proposed system should have a high-speed network interconnect between all components including application nodes, storage nodes.
6	<p>The solution vendor should provide single support to all the people hub components, operating system, and hardware.</p> <ul style="list-style-type: none">• Operating System• Virtualization• Servers• Storage• Network• Embedded network switching technology
7	All hardware components from Server, Storage and networking switch equipment's should be able to provide industrial standard iLoM access for remote and lite-out management for Datacenter management efficiency.
8	Proposed application server should provide support for certificate management without additional software

10.2 Hardware Requirements

The minimum bill of material is as shown below, however the Supplier must perform their own assessment in order to meet SLA requirements and successful operation of the system. The following chapters provide a snapshot of bill of material required to be in place for the People Hub architecture.

10.2.1 Sizing Parameters

Minimum Hardware requirement for People Hub system should be based on the below parameters:

- Response Time –
 - User Authentication and Authorization < 1 seconds
 - Services that just retrieve data < 2 Sec
 - Services that retrieve and/or manipulate data < 4 Sec
 - Aadhaar based services/Biometric Services < 6 Sec
- Expected Transactions per second for People Hub Services > 500
- Expected number of Applications supported 60 (Approx.)
- Concurrent Users - Approximately 1000 (Assuming each transaction takes about 20 seconds on an average)

Proposed solution should be scalable to enhance them as and when required with upgradation of component wise hardware like RAM, Processing speed Storage capacity Network etc.

10.2.2 Hardware

No.	Description	DC Quantity	DR Quantity
1	Database Server	8	4
2	Application Server	4	2
3	Portal/Web Server	4	2
4	Server Load balancer	2	1
5	Reverse Proxy	2	1
6	SAN Storage Space	2TB Usable	2TB Usable
7	HSM and DB encryption device	2	1
8	SSL VPN	2	1

Note –

1. Directory/Antivirus/Backup Server will be used from existing Data center Server
2. Firewall /Intrusion Prevention System will be used from existing Data center Server
3. SAN Switch and SAN Storage process will be leveraged by SDC central storage system
4. Tape Library will be leveraged from existing central backup system, bidder should be procure the online client licenses for backup of People hub systems including Application, Web and Database servers.

10.2.3 Server Specifications details for reference

Hardware is required for 1000 concurrent users

Process	Criteria	Minimum Recommended
Web Server (4 Nodes with load balancer)	Processor	Dual Xeon E7 V3 2.2GHz 16C/32T or better
	RAM	64 GB per node
	SAN Storage(Fiber SAN)	300 GB per node
	Network	4 x 1 GB NIC
Application Server (2 - 4 Nodes Cluster for high availability)	Processor	2 x Dual Xeon E7 V3 3.0 GHz 16C/32T or better
	RAM	64 GB per node
	Network	4 x 1 GB NIC
	SAN Storage (Fiber SAN)	600 -800 GB per node
Database Servers (4-8 Nodes Cluster for HA and high Compute)	Processor	2 x Dual Xeon E7 V3 3.6 GHz 16C/32T or better
	RAM	128 GB per node
	SAN Storage space (Fiber SAN)	2 TB usable
	Network	4 x 1 GB NIC

Note –

1. Near line Site: Supplier should propose solution (including hardware, software, and networking) as per following requirement
 - a. Zero Data Loss Requirement: Supplier should build Near DR site to achieve RPO as Zero Minute and RTO as 6 hours
 - b. Server Room Management:Supplier should propose Server Room Management Tool for monitoring of RPO & RTO and shall perform Server Room Drill every quarter till the time Servers are in their control(3 Years)
2. Above figures are indicative for initial design and should be scalable for each and every level manage higher load for more than 50000 concurrent users in future.
3. Above indicative size is for physical server which can be replaced by equivalent virtual server as per availability.
4. All other supporting hardware like load balancer, network equipment, backup architecture, etc. will be considered by bidder to support for implement and working for the proposed People Hub system.
5. For Data Centre hosting space will be responsibility of bidder and later after 3 years needs to be transferred to newly build Data Centre at new Capital.

6. For NearDR Site hosting space will also responsibility of bidder and later point of time will be migrated to decided place by GoAP after 3 year.
7. Payment Gateway and SMS Gateway is Supplier responsibility

10.2.4 Application Software & System Software

S. No	Components	QTY
1	Application Software (COTS or Bespok)	As per Solution
2	Operating System	As per Solution
3	Database Server	As per Solution
5	Portal/Web Server	As per Solution

10.2.5 Help Desk

S. No	Equipment's	Units (No.)
1	Hand and Head Set	10
2	Any Additional Equipment's (IPBEX Etc.)	As required
3	Desktop for helpdesk staff	10
4	Phone Connection & line	As required

10.2.6 Manpower to Manage DC and NDR and DR on 24 x 7 Basis

S. No	Manpower	QTY
1	IT Infrastructure / Data Center Manager	1
2	Database Administrator	2
3	Systems Administrator	2
4	Network Support Staff	1
5	Technical Support Services	3

Annexure 1 – Smart Pulse Survey



Smart Pulse Survey -
Approach Document

Annexure 2 – AADHAAR Seeding

Organic Seeding of Aadhaar: In this method, the Unique People IDs of the beneficiaries are collected through a door-to-door survey or at point-of-sale. Alternative methods are collection of Unique People ID through IVRS, SMS or drop boxes. Departments with large databases can also engage 3rd party service providers.

Inorganic Seeding of Aadhaar: In this method, the demographic data of the departmental database is matched with that of SRDH through a computer algorithm, and wherever the degree of matching exceeds a threshold level defined, the Unique People ID of the resident as in SRDH database is included in the departmental database.

Annexure 3 – SRDH AS-IS Architecture

In order to make best use of existing resources, and to reduce cost, it is important to understand what existing APSRDH has to offer in the context of target architecture. Therefore a study has to be done to understand AS-IS Architecture of APSRDH. Given below are key information about the current APSRDH Architecture

AP IT&C department initiated the State Resident Data Hub (SRDH) Project to maintain the consistency, efficiency, and transparency to the citizens. The hub was conceived to be a unique citizen database for AP Residents to help government implement schemes effectively and efficiently.

Given the requirements of People Hub and the current architecture of SRDH, it is possible to reuse SRDH for People Hub. Given below are some of the key features of SRDH that will be useful for developing the People Hub.

S. No	Feature Description
1.	Database Structure Database contains four major categories of data: a. Master Data – Common Master Data e.g. District/Block/Village etc. b. User Management Data – Contains user specific data – Role type, user id, password etc. c. Department Data - Demographic and transactional data from departments. E.g.: Authentication status, Verification status etc. UID Data – UID demographic data and transactions. E.g.: Consent Status, Authentication Status etc.
2.	Standards – SRDH is based on the following standards a. Database Standards: i. eGovernance Metadata Standards (MDDS) ii. Data Access is provided based on user group, and their roles in a department b. Data Administration Standards: i. DBA standards are established for creating data backup plan and recovery procedures, and monitoring and tuning performance of the hub. ii. System Administration Standards are established for guiding DBMS installation, upgrade, testing, and maintenance processes. c. Database Security Standards – ISO27001

3.	<p>Services provided by SRDH</p> <p>Data Services:</p> <ul style="list-style-type: none"> a. Convergence services b. Aadhaar Information service <p>Application Services:</p> <ul style="list-style-type: none"> a. Biometric Authentication b. Demographic Verification c. e-KYC d. Beneficiary Authentication (Including bulk authentication) e. Citizen profile <p>Service Consumed by SRDH (offered by departments)</p> <ul style="list-style-type: none"> a. Data synchronization service
4.	<p>Data Quality Services</p> <ul style="list-style-type: none"> a. Data Cleansing b. Data de-duplication c. AADHAAR Seeding
5.	<p>User management – Multi-level users based on roles and responsibilities.</p>
6.	<p>Architecture Overview</p> <ul style="list-style-type: none"> a. Database – A Central database which holds <ul style="list-style-type: none"> i. People Hub Data– UID demographic data ii. Master Data – Location master data (District, Mandal, etc) iii. User Management Table – To manage access to data iv. Department Tables – contains demographic data from different departments which is refreshed every night. Each department will have a separate set of tables. The tables also store transaction information like “Approved/ Rejected” etc. The data from departments are transformed to e-governance standards b. Services – Data and application services are offered as web services through point-to-point connections between requestor and SRDH. SRDH consumes services offered by departments, and this too happens on a point-to-point basis. The requestor sends requests to SRDH using SOAP over HTTP protocol. Based on the service invoked, SRDH either processes the requests and sends back responses to the requestor, or forwards the request to UIDAI and forwards the response from UIDAI to the requestor. c. Data exchange protocol – SOAP/ HTTP
7.	<p>Reporting</p> <ul style="list-style-type: none"> a. Fraud data reports b. Graphical reports c. Aadhaar seeding reports d. Data quality reports

8.	Non-Functional Features: <ul style="list-style-type: none"> a. Availability b. Reliability c. Manageability (Maintainability) d. Usability e. Scalability f. Performance <ul style="list-style-type: none"> i. Number of Applications Supported ii. Number of Service calls per day iii. Number of Point-to-Point connections
9.	Technical Stack Database – Oracle Exadata Application – Java based